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Herpetofauna, Coastal Dunes, Buenos Aires Province, Argentina

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Abstract
Coastal dunes habitats at Buenos Aires province are in a fragmentation and habitat loss process due to related human activities. Knowledge on the herpetofauna of Buenos Aires province coast habitats is plentiful for some species of lizards and scarce for most amphibians and snakes. With the aim to present a list on the amphibians and reptiles of the coastal dune habitats in Buenos Aires province we recorded species coming from field work, cited in literature, and vouchers specimens deposited in herpetological collections. We recorded 35 species in six sectors that represent the last remnants of coastal dunes in good conservation status. The Mar Chiquita and Faro Querandí Reserves represent an important contribution to the conservation of several species that inhabit coastal dune habitats. It is necessary to increase the knowledge on biodiversity in those habitats in order to develop conservation strategies.

Introduction
Atlantic coast of Buenos Aires province is included in the Argentine Pampean region (Cabrera 1976). Buenos Aires province coast had a high diversity of natural habitats, with sand beaches, cliffs, extended sand dunes fields, salt marshes, islands, and one important coastal lagoon, Mar Chiquita (Iribarne 2001). Only a few remnants of these habitats exist actually and there is not a sustainable management plan for those areas (Bertonatti and Corcuera 2000). The main causes of fragmentation and habitat loss in coastal dune habitats are the urban development, the inadequate management of sand beaches, the sand extraction for construction, the utilization of exotic plants for dune firmness, and the transit of motorcycles and double-traction vehicles (Isla and Gaido 2001).

Knowledge on the herpetofauna of the Buenos Aires coastal habitats is scarce for most amphibian and snake species, and abundant for some lizard species (Vega 2001). Information on amphibian and reptile species distribution were found in Gallardo (1987), Cei (1980; 1993) and Montero (1996) for Argentina, and Gallardo (1974; 1977), Williams (1991), and Lavilla et al. (2000) for Buenos Aires province. However, there are the few records at coastal dunes in the Buenos Aires province (Vega 1994; Bellagamba and Vega 1996; Vega and Bellagamba 1996; Vega 2001; Perez and Petracci 2004).

The aim of this article is to present a list on the amphibians and reptiles of the coastal dune habitats in Buenos Aires province.

Materials and Methods
Study site
Study site includes several sectors of the coastal dunes placed at Buenos Aires province. The mean temperature is about 20 ºC in summer and 8.1 ºC in winter, and the mean precipitation is about 700mm/year (Reta et al. 2001). We worked at six coast dune sectors (Figure 1): (1) Partido de la Costa (36º25' S, 56º42' W); (2) Punta Médanos (36º50' S, 56º41' W); (3) Faro Querandí Municipal Reserve (37º30' S, 57º08' W); (4) Mar Chiquita Provincial Reserve (37º37' S, 57º20' W); (5) Mar del Sur (38º17' S, 57º51' W); and (6) Dunes located between Necochea and Pehuen-Có (38º34' to 38º57' S, 58º43' to 61º53' W). These sectors represent the last remnants of coastal dunes in good conservation status, and sectors 1, 2, 3, 4, and 6 have been declared as "Grassland Valuable Areas" in Bilenca and Miñarro (2004). We differentiate five natural microhabitat types: (a) temporary wetlands sited at interdunes (whit dominance of *Typha sp.* and *Juncus sp.*); (b) low vegetation cover grasslands (with dominance of *Spartina sp.*); (c) middle and high vegetation cover grasslands (with dominance of *Cortadeira sp.*); (d) dunes without vegetation cover; and (e) the ecotonal area placed between the pampean grasslands and the dunes grasslands.

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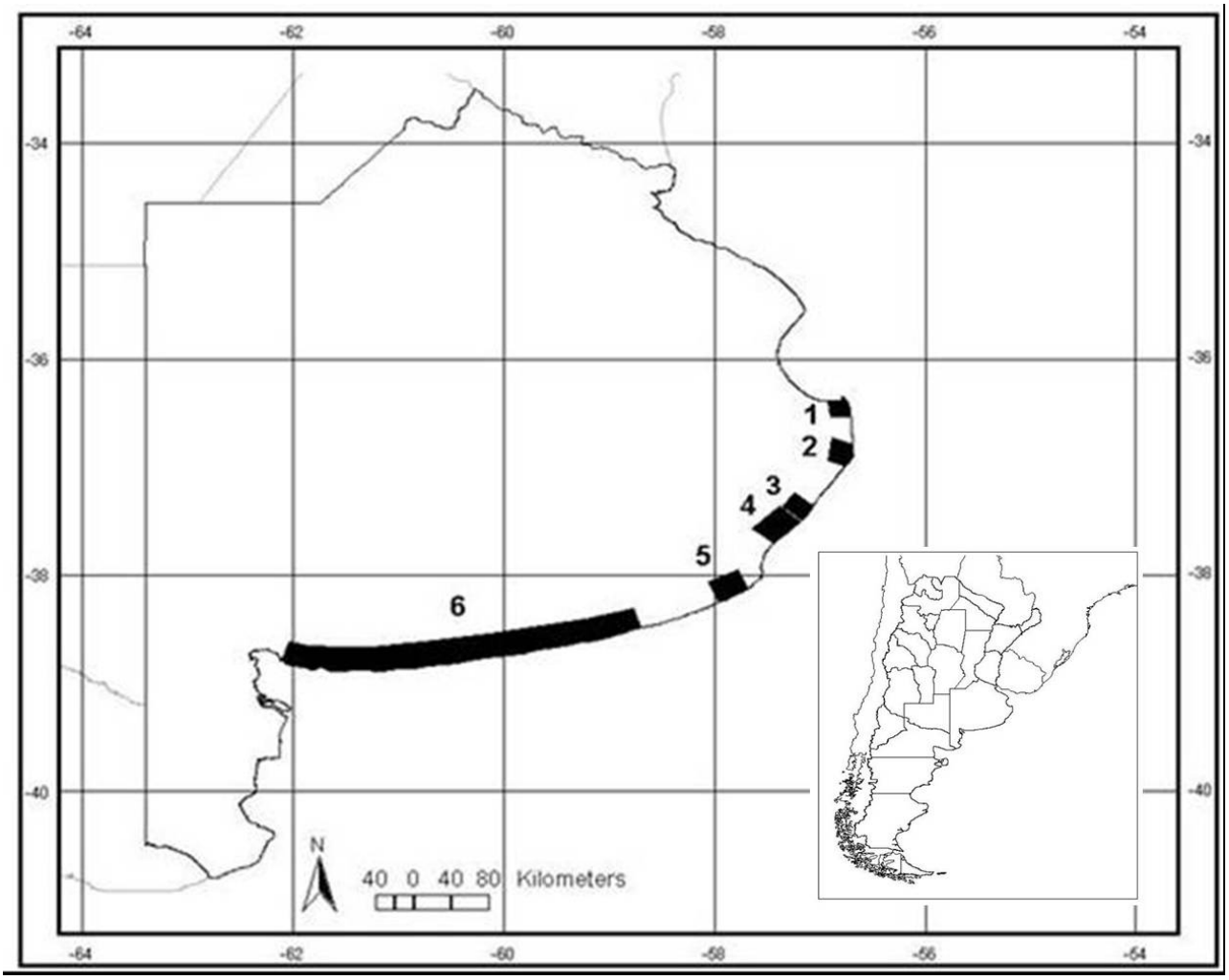

Figure 1. Map of the Buenos Aires province showing the six remnants of coastal dune sectors: (1) Partido de la Costa; (2) Punta Médanos; (3) Faro Querandí Municipal Reserve; (4) Mar Chiquita Provincial Reserve; (5) Mar del Sur; and (6) Dunes between Necochea and Pehuen-Có.

Data collection

We present a list on amphibian and reptile distribution for the six coastal dune sectors on the basis of field work, literature, and herpetological collections reviewed. We differentiated two species categories: confirmed and not confirmed species. Confirmed species are those ones that have: (a) vouchers specimens, cited in Williams (1991) Bellagamba and Vega (1996), Vega and Bellagamba (1996), Montero (1996), Vega (1994; 2001), and Perez and Petracci (2004), or deposited in the herpetological collections of the Museo de Ciencias Naturales de La Plata, and the Museo de Ciencias Naturales Bernadino Rivadavia; and/or (b) photographic and field records from exhaustive surveys (300 days man/effort approximately) carried out in summers of 2005 and 2006 at sectors 1, 3, 4, and 6. All field records correspond to conspicuous species and for this reason we do not collected vouchers specimens. Not confirmed species are those one that are cited for coastal dune sectors in Gallardo (1974; 1977), Cei (1980; 1993), Stranek et al. (1993), and Giambeluca (2001) without voucher specimens mention. In the list, each species are assigned at one or more microhabitat type on the basis of our records and the knowledge of species life history.

Results and discussion

A total of 11 amphibian species and 24 reptile species are present in those coastal dune sectors (Table 1; Figures 2 to 5). Those 35 species

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represent 48 % of the 73 species cited at Buenos Aires province (Lavilla et al. 2000). The Faro Querandí and Mar Chiquita Reserves sustain 86 % (30 spp.) of the total species cited at Buenos Aires coastal dunes. These reserves represent an important contribution to the conservation of several herpetofaunal species that inhabit coastal dune habitats.

The lizard *Liolaemus multimaculatus* (Figure 2) is a "vulnerable species" (Lavilla et al. 2000), and thus deserves special comments. This Sand Dunes Lizard is an endemic species of coastal dunes in Buenos Aires and Río Negro provinces. It prefers microhabitats whit low vegetation cover due to their "sand swimming" behavior (burying into the sand). Populations of *L. multimaculatus* have decreased in some disturbed areas (Vega et al. 2000). In the Mar Chiquita Reserve, the Sand Dunes Lizard was a common species, easy to detect, with high abundance in relation to other sympatric sand lizards like *L. wiegmanni* (Figure 3) and *Stenocercus pectinatus*. The conservation of *L. multimaculatus* depends of the protection of native vegetation patches, mainly of *Spartina sp.* grasslands (Iribarne 2001).

Habitat fragmentation and related human activities in coast dunes can have a negative effect on sensitive species, for example, on sand dune lizards, with a consequent decrease of the biodiversity (Vega et al. 2000). Thus, it is very important to increase the knowledge on the biodiversity of the coastal sand dunes at Buenos Aires province in order to develop conservation strategies for habitats and threatened species.

Figure 2. *Liolaemus multimaculatus* from Pehuen-Có dunes (sector 6). Photo: A. L. Monserrat and C. Celsi.

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Table 1. List of amphibians and reptiles at Buenos Aires province coastal dunes. Microhabitat types: (a) temporary wetlands; (b) low vegetation cover grasslands; (c) middle and high vegetation cover grasslands; (d) dunes without vegetation cover and; (e) ecotonal grasslands. Coastal dune sectors: (1) Partido de la Costa; (2) Punta Médanos; (3) Faro Querandí Municipal Reserve; (4) Mar Chiquita Provincial Reserve; (5) Mar del Sur and; (6) Dunes between Necochea and Pehuen-Có. Not confirmed species were marked with a "?" following the dune sector number.

FAMILY	SPECIES	Microhabitat Types	Dune Sectors
AMPHIBIA			
Bufonidae	*Bufo arenarum*	a b c e	1 2 3 4 5 6
	Bufo dorbignyi	a c e	1 2 3 4 5? 6
Leptodactylidae	*Ceratophrys ornata*	a c e	1 2 3 4 5 6
	Leptodactylus mystacinus	a c	1 2 3 4 5 6
	Leptodactylus ocellatus	a c e	1 2 3 4 5 6
	Odontophrynus americanus	a c e	1 2 3 4 5 6
	Odontophrynus occidentalis	a c e	6
	Physalaemus fernandezae	a c e	1 2 3 4 5 6
Hylidae	*Hypsiboas pulchellus*	a c	1 2 3 4 5 6
	Scinax squalirostris	a c	1? 2? 3? 4
	Scinax nasicus	a c	1? 2? 3? 4
REPTILES			
Amphisbaenidae	*Amphisbaena a. angustifrons*	a c e	1 2 3? 4? 5? 6
	Amphisbaena darwini heterozonata	a c e	1 2 3 4 5? 6
	Anops kingi	a c e	1? 2? 3? 4? 5? 6
Liolaemidae	*Liolaemus darwinii*	c e	6
	Liolaemus gracilis	c e	5 6
	Liolaemus multimaculatus	b d	1 2 3 4 5 6
	Liolaemus wiegmanni	a c e	1 2 3 4 5 6
Tropiduridae	*Stenocercus pectinatus*	a c e	1 2 3 4 5 6
Teiidae	*Cnemidophorus longicaudus*	a c e	6
	Tupinambis merianae	a c e	1? 2? 3? 4 5? 6
Gymnophthalmidae	*Cercosaura schreibersii*	a c e	1? 2? 3? 4
Anguidae	*Ophiodes vertebralis*	a c e	1 2 3 4 5 6
Leptotyphlopidae	*Leptotyphlops munoai*	a c e	1 2 3 4 5? 6
Colubridae	*Liophis anomalus*	a c e	1 2 3 4 5 6
	Liophis poecilogyrus sublineatus	a c e	1 2 3 4 5 6
	Lystrophis dorbignyi	a b c e	1 2 3 4 5 6
	Lystrophis semicinctus	a c e	1 2 3 4 5 6
	Clelia rustica	a c e	1 2 3 4 5 6
	Oxyrhopus r. rhombifer	a c e	1 2 3 4 5 6
	Philodryas patagoniensis	a b c e	1 2 3 4 5 6
	Phalotris bilineatus	a c e	1 2 3 4 5 6
	Thamnodynastes hypoconia	a b c e	1 2 3 4
Viperidae	*Bothrops alternatus*	c e	1 2 3 4 5 6
	Bothrops ammodytoides	c e	5 6

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Figure 3. *Liolaemus wiegmanni* from "Partido de la Costa" (sector 2). Photo: J. Williams.

Figure 4. *Liophis poecilogyrus sublineatus* from "Partido de la Costa" (sector 2). Photo: J. Williams.

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Figure 5. *Lystrophis dorbignyi* from "Partido de la Costa" (sector 2). Photo: J. Williams.

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